Math 1050 – Exam 3 Review

For the given functions f and g, find the requested composite function and <u>give its domain</u>.

1. $f(x)=\dfrac{7}{x-3},\ g(x)=2x+11;$ Find $(f\circ g)(x)$.

2. $f(x)=2x+5,\ g(x)=\sqrt{x-3};$ Find $(g\circ f)(x)$.

3. $f(x)=\dfrac{2}{x+4},\ g(x)=\dfrac{3}{5x};$ Find $(f\circ g)(x)$.

For the given functions f and g, find the requested composite function value.

4. $f(x)=\sqrt{x+2},\ g(x)=2x^2+1;$ Find $(g\circ f)(7)$.

Answer the question.

5. What makes a function one-to-one? How can you tell if a function is one-to-one by looking at its graph?

Decide whether or not the functions are inverses of each other. Show all your work.

6. $f(x)=3x-6;\ g(x)=\dfrac{1}{3}x+2$

7. $f(x)=4x+5;\ g(x)=\dfrac{1}{4}x-5$

Find the inverse function of f. State the domain and range of f and f^{-1}.

8. $f(x)=\dfrac{4}{x+3}$

9. $f(x)=\dfrac{2x+3}{5x-7}$

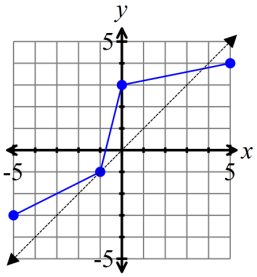
10. $f(x)=\log_2(x-3)$

11. $f(x)=2e^{x+5}$

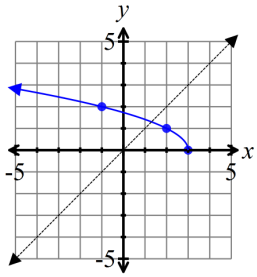
12. $f(x)=x^2-3,\ x\ge 0$

The graph of a one-to-one function is given. Draw the graph of the inverse function f^{-1}. For convenience, the graph of $y=x$ is also given.

13.

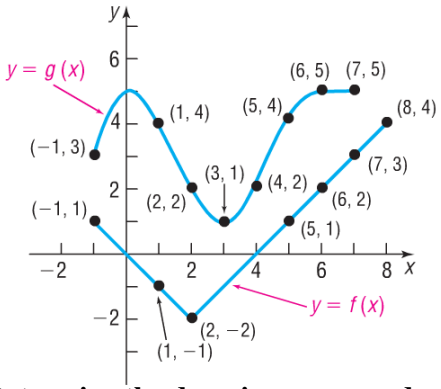


14.



Evaluate the expression using the values given on the graph.

15. Find $(f\circ g)(4)$



Graph the function. Determine the domain, range, and asymptotes of the function.

16. $f(x)=2^x$

17. $f(x)=4^{x+2}$

18. $f(x)=\left(\dfrac{1}{2}\right)^x-1$

19. $f(x)=\log_{1/2}x$

20. $f(x)=\log_3(x-1)$

21. $f(x)=\log_2 x+3$

Solve the equation.

22. $3^{2x-5} = 27$
23. $2 \cdot 6^{4t-1} = 72$
24. $2e^{5x} = 6$
25. $5^{x+2} = 8^{3x-1}$
26. $\log_3(x-4) = 2$
27. $\log_2 x + \log_2(x-2) = 3$
28. $\log_4(x^2 - 6x) = 2$
29. $\log(4x) = \log 3 + \log(x+5)$
30. $4^x + 2 \cdot 2^x - 8 = 0$

Find the exact value of the expression.

31. $\log_2 32$
32. $\log_4 \frac{1}{16}$
33. $\ln e$
34. $\log_5 1$
35. $\log_7 \sqrt{7}$
36. $3^{\log_3 5}$
37. $\log_6 6^{-9}$

Change the exponential equation into an equivalent equation involving a logarithm.

38. $2^5 = 32$
39. $e^x = 10$

Change the logarithmic equation into an equivalent exponential equation.

40. $\log x = 8.3$
41. $\log_5 125 = x$

Write as a sum or difference of logarithms. Express powers as factors.

42. $\log_8\left(\frac{2x-3}{x^4}\right)$
43. $\ln\left(\frac{x^4}{y^5 z^3}\right)$
44. $\log\left(\frac{x}{x+1}\right)^3$

Express as a single logarithm.

45. $2\ln x + 4\ln(x-5) - 6\ln(x+3)$
46. $3\log_3 x - 2\log_3 y - \log_3 z$

Find the domain of the function.

47. $f(x) = \log_2(x-9)$
48. $f(x) = \ln(-5-x)$
49. $f(x) = \log(x^2 + 2x - 3)$
50. $f(x) = \log_2\left(\frac{x+1}{x-2}\right)$

Use the Change-of-Base Formula and a calculator to evaluate the logarithm. Round your answer to two decimal places.

51. $\log_{13} 210$
52. $\log_{1/4} 28$

Find the amount that results from the investment.

53. $10,000 invested at 8% compounded daily after a period of 5 years.
54. $7,500 invested at 9% compounded continuously after a period of 8 years.

Find the present value. Round to the nearest cent.

55. To get $8200 after 3 years at 7% compounded monthly.
56. To get $20,000 after 10 years at 5% compounded continuously.

Solve the problem.

57. How long does it take $2000 to double if it is invested at 6% interest, compounded quarterly?

58. The size P of a small bacteria population at time t, in hours, is given by $P(t) = 400e^{0.23t}$. After how many hours will the population reach 2000?

59. The half-life of Linfordium is 630 years. If 50 grams are present now, how much will be present in 800 years?

60. A fossilized leaf contains 10% of its original amount of carbon 14. How old is the fossil? Use 5600 years as the half-life of carbon 14.